

Lubricating Systems

As oil travels through the engine, heat generated by combustion and friction is transferred to it. The oil must then be cooled before returning to the hot sections of the engine. An oil cooler, which is functionally similar to an automobile radiator, is used as a heat exchanger between hot oil and outside ram air. A thermostatic valve routes hot oil through the core of the heat exchanger for cooling or bypasses cold oil around the core. The sensor for the pilot's oil temperature gauge is located where the oil enters the engine after it has passed through or around the cooler. Some gauges are electrically powered, while others are mechanical.

Cooled oil is either sprayed or injected onto the crankshaft, camshaft, propshaft bearing, accessory drive bearings, cylinder walls, pistons, and various gears and parts. Both constant-speed propeller governors and turbochargers also use system oil. The oil then drains into the sump and the cycle begins again. To check oil quantity, a dipstick marked in quarts is provided; a filler tube is also provided to add oil. It is important to check the security of both the dipstick and the filler tube prior to every flight to assure that the caps are secure. Low ambient pressure during flight may cause oil to be siphoned out of the engine if either cap is missing.

PREVENTIVE MAINTENANCE

Maintaining an oil system is really a threefold consideration: selection of the proper lubricant, maintaining the required level of healthy oil, and regularly checking the health of the engine by having used oil tested.

It is critical that you only use the grade of oil specified by the engine manufacturer. If there is any question at all, call the manufacturer and ask. Using the wrong oil can not only drastically shorten the life of the engine but also can potentially lead to an in-flight catastrophic engine failure. Automotive oils, even when the numbers are the same, are not approved for aircraft use because they contain additives that will cause problems in aircraft engines.

Oil quantity should be maintained at the level recommended in the pilot's operating handbook (POH). This simple, pilot-performed preventive maintenance measure should be done before every flight. To assure accurate measurement, the aircraft should be in a level attitude. The dipstick should be removed, wiped with a clean rag, pushed all the way back into the dipstick tube, then removed again and read.

Cold-weather starting requires special consideration. Always follow the manufacturer's recommendations, but a good rule of thumb is to use a preheat whenever the temperature falls below freezing. It is very common for operators of aircraft in very cold climates to install winter oil baffles, which cut down on airflow cooling. When warm weather returns, however, be sure to remove the baffles.

In winter, excessive fuel priming before engine start washes oil from the cylinder walls with a twofold penalty: accelerated engine wear and potential fire hazard. Always keep the power setting low until the engine warms up, and avoid any abrupt power change prior to normal operating temperature. Oil, congealed by the cold, will sit in the bottom of the engine until the rising temperature thins it out enough for it to flow. Until that happens, the lack of oil flow results in excessive engine wear. Make no mistake;